REMARKS

This is a full and timely response to the non-final Official Action mailed **February 7, 2005**. Reconsideration of the application in light of the above amendments and the following remarks is respectfully requested.

By the forgoing amendment, various claims have been amended. No claims are added or cancelled. Claims 23-26 and 35-39 were withdrawn under a previous Restriction Requirement. Thus, claims 1-22, 27-34 and 40-47 are currently pending for further action.

In the outstanding Office Action, the Examiner indicated the presence of allowable subject matter in claims 4 and 13. Applicant wishes to thank the Examiner for this identification of allowable subject matter.

With regard to the prior art, Claims 3, 12, 27, 29-33 and 46-47 were rejected under 35 U.S.C. § 103(a) in view of the combined teachings of the article "An Evaluation of Face and Ear Biometrics" by Victor et al. ("Victor") and the article "Human Ear Recognition in 3D" by Bhanu and Chen ("Bhanu"). This rejection is respectfully traversed for at least the following reasons.

Claim 46 recites.

> A system for generating an image database comprising:
> a means for generating a three-dimensional image of a subject; and
> a computing device communicatively coupled to said means for generating a three-dimensional image;
> wherein said computing device is configured to receive a three-dimensional image from said means for generating a three-dimensional image and generate multiple two-dimensional images, each two-dimensional image having a varied orientation or illumination condition based on said three-dimensional image.

(emphasis added).

In contrast, neither Victor nor Bhanu teaches or suggests generating multiple two-dimensional images based on a three-dimensional image. Victor does not mention three-dimensional images and is, therefore, irrelevant to this feature of claim 46. Bhanu teaches the use of "2D histograms," but histograms are *not* two-dimensional images as claimed. Rather, as explained by Bhanu, a "2D historgram consists of shapes indexes and angles between the normal of reference point and that of its neighbors." (Bhanu, col. 2, first full paragraph). Moreover, only one 2D historgram is generated for each 3D ear representation.

Consequently, no prior art reference of record teaches or suggests a computing device as recited in claim 46 that generates multiple two-dimensional images, each two-dimensional image having a varied orientation or illumination condition based on a corresponding three-dimensional image. "To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)." M.P.E.P. § 2143.03. Accord. M.P.E.P. § 706.02(j). For at least this reason, the rejection of claims 46 and 47 should be reconsidered and withdrawn.

Claim 12, which as been amended herein as an independent claim, recites:

> A method of creating and using a database of ear images for automatic human identification comprising:
> generating a three-dimensional image of an ear for each of a number of identified people; and
> generating a database comprising a plurality of two-dimensional images based on each said three-dimensional image;
> wherein each of said plurality of two-dimensional images represents a varied orientation or illumination condition on said three-dimensional image.

As demonstrated above, neither Victor nor Bhanu teach or suggest a method that involves generating a database of two-dimensional images based on three-dimensional images of the ears of identified people as claimed. Again, "[t]o establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In*

re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)." M.P.E.P. § 2143.03. Accord. M.P.E.P. § 706.02(j). For at least this reason, the rejection of claims 11-18 should be reconsidered and withdrawn.

Independent claim 27 recites

> A system for three-dimensional biometric identification comprising:
> a camera system;
> a database of images of identified ears, wherein said database of images comprises a three-dimensional image of an ear of each of a plurality of identified subjects and a plurality of two-dimensional images generated from each of said three-dimensional images, wherein each of said two-dimensional images represents a varied orientation or illumination condition on a corresponding three-dimensional image; and
> a computing device communicatively coupled to said camera system and to said database of images of identified ears;
> wherein said computing device is configured to match an image of a subject's ear acquired by said camera system against said database of images of identified ears to identify said subject.

(emphasis added).

As demonstrated above, neither Victor nor Bhanu teach or suggest a system that involves a database of two-dimensional images based on three-dimensional images of the ears of identified subjects as claimed in claim 27. Again, "[t]o establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)." M.P.E.P. § 2143.03. Accord. M.P.E.P. § 706.02(j). For at least this reason, the rejection of claims 27-34 should be reconsidered and withdrawn.

Claims 1, 2, 5-8, 11, 14-17, 19-22 and 40-45 were rejected as anticipated under 35 U.S.C. § 102(b) by Victor. Claims 9, 10, 18, 28 and 34 were rejected under 35 U.S.C. § 103(a) in view of the teachings of Victor taken alone. For at least the following reasons, these rejections are respectfully traversed.

Claim 1 recites:

> A method of automatic human identification, said method comprising matching an image of a subject's ear against a database of images of ears of identified subjects to identify said subject, wherein said database of images comprises a three-dimensional image of an ear of each of a plurality of identified subjects and a plurality of two-dimensional images generated from each of said three-dimensional images, wherein each of said two-dimensional images represents a varied orientation or illumination condition on a corresponding three-dimensional image.

(emphasis added).

As demonstrated above, neither Victor nor Bhanu teach or suggest a method that involves a database of two-dimensional images generated from three-dimensional images of the ears of identified subjects as claimed. "A claim is anticipated [under 35 U.S.C. § 102] only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987) (emphasis added). See M.P.E.P. § 2131. For at least this reason, the rejection of claims 1-10 should be reconsidered and withdrawn.

Independent claim 40 recites:

> A system for three-dimensional biometric identification comprising:
> a means for generating a two-dimensional image of a subject's ear;
> a database of images of identified ears, wherein said database of images comprises a three-dimensional image of an ear of each of a plurality of identified subjects and a plurality of two-dimensional images generated from each of said three-dimensional images, wherein each of said two-dimensional images represents a varied orientation or illumination condition on a corresponding three-dimensional image; and
> a means for matching said two-dimensional image of a subject's ear against said database of images of identified ears to identify said subject.

(emphasis added).

As demonstrated above, neither Victor nor Bhanu teach or suggest a system for biometric identification that involves a database of two-dimensional images generated from three-dimensional images of the ears of identified subjects as claimed. "A claim is anticipated [under 35 U.S.C. § 102] only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal*

Bros. v. Union Oil Co. of California, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987) (emphasis added). See M.P.E.P. § 2131. For at least this reason, the rejection of claims 40-45 should be reconsidered and withdrawn.

Claim 19 recites: "An image matching method comprising performing an Eigen-ears identification method." The concept of the "Eigen-ear" is unique to Applicant's specification and is not taught or suggested in Victor or any other prior art reference of record.

According to Applicant's specification,

> The "Eigen-Ear" based recognition approach extends the "Eigenface" approach developed by Pentland group [Turk & Pentland, Eigenfaces for recognition, J. Cognitive Neuroscience, 3(1), 1991] to the ear recognition applications. Accordingly, the Eigen-Ear based recognition approach is an efficient coding approach for comparing ear features with a database of previously stored images, which are similarly encoded.
>
> The underlining concept of the "Eigen-Ear" based recognition approach is to find a set of ear images called Eigen-Ears (i.e., the eigenvectors of the covariance matrix of a given set of ear images) so that all ear images can be represented by a linear combination of the Eigen-Ears. By choosing "M" most dominant eigenvectors in the eigenspace based on the eigenvalues, an ear image can be approximated using only a lower dimension subspace span.

(Applicant's spec., paragraphs 00061 and 0062).

In contrast, neither Victor nor Bahnu teaches or suggests the concept of the Eigen-ear as defined and claimed by Applicant. Consequently, Victor does not teach or suggest the claimed image matching method comprising performing an Eigen-ears identification method."

"A claim is anticipated [under 35 U.S.C. § 102] only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987) (emphasis added). See M.P.E.P. § 2131. For at least this reason, the rejection of claims 19-22 should be reconsidered and withdrawn.

If any fees are owed in connection with this paper, which have not been elsewhere authorized, authorization is hereby given to charge those fees to Deposit Account 18-0013 in the name of Rader, Fishman & Grauer PLLC. If the Examiner has any comments or suggestions which could place this application in even better form, the Examiner is requested to telephone the undersigned attorney at the number listed below.

Respectfully submitted,

DATE: 6 May 2005

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DATE OF DEPOSIT: **May 6, 2005**

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail on the date indicated above in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Rebecca R. Schow